THE FOUNDRY

VOL. 3. DETROIT, MICH., NOV. 1893. No. 15.

An Improved Hand-Power Foundry Crane.

THE value of any hoisting apparatus for foundry or other fine work depends upon its more or less perfect running. Thus for the lifting of copes or molds the ordinary chain and sprocket wheel are almost useless. Made as carefully as possible, a chain running over a sprocket wheel will, as each link leaves its pocket, jar the load. The sand is liable to crack and the mold to break down.

With a view of obviating this difficulty, a new crane has been designed by Edward Harrington, Son & Co., Incorporated, of Philadelphia, Pa. That it is a great success the accompanying letter of a well-known firm of stove manufacturers abundantly proves.

As will be seen by the engraving, the sprocket wheels of the hoist have been replaced by a drum, having right and left spiral grooves, thus insuring the hanging of the hook always over the same point. There is no jumping or jarring; the movement is sure and steady, the chain winding and unwinding with the regularity of a rope on a windlass. Thus the cope can be lifted and lowered with no danger of the sand falling out, or mold "breaking down." The internal gears of this hoist are worked by means of a shaft extended far enough beyond the beam of the bridge to prevent the chain from interfering with the load, and this also enables the operator to stand at a respectful distance from a ladle of melted iron.

The crane is operated by geared wheels throughout, and the shaft of the crane is placed inside of the beam, thus saving room, and it moves the crane by pinions and intermediate gears, all of which are furnished with roller bearings, producing easy movement.

ISAAC A SHEPPARD & CO.
Excelsior Stove Works and Hollow Ware Foundry.
N E Cor Fourth Street and Montgomery Avenue.

Philadelphia, September 18, 1893.

Messrs. Edwin Harrington, Son & Co.

Fifteenth & Pennsylvania Ave. Philada.

Gentlemen:-

In reply to your inquiry of the 14th. inst., we would say that we are greatly pleased with the special foundry crane which you recently erected in our foundry. It is, in every way, perfectly adapted to the use for which it was intended, and lifts a mould absolutely without jar, so that we have not had the least trouble with the breaking down of a mould at the critical point. For a light foundry crane, we hardly see how it can be improved upon.

Very truly yours,

Isaac A Sheppard & Co.

I am only too pleased to forward my subscription for another year. Wishing THE FOUNDRY every success,

Yours,
WILLIAM OSBORN,
Toronto, Ont.

We trust your paper will still continue to increase, for we believe it has been a source of much good to the business during the past. We can truthfully say that we have learned several things from THE FOUNDRY that have been of great benefit to us in making sound castings both in brass and iron. Trusting your paper will increase in knowledge and circulation in the future, we remain, Yours truly,

JAMES ANDERSON & SONS,
Salt Lake City, Utah.

A Large Cast Steel Wheel.

IN the great struggle between the rival systems of rapid transit in our cities, we see today a development and refinement of methods that was undreamed of but a few years ago. Although the various electric systems have made very wonderful strides in advance since the introduction of the trolley, cable roads still have their strong advocates and material advantages. A road of the modern type thoroughly equipped with the most approved appliances is at the present writing being operated in Denver by the Denver City Cable Railroad Co. One of the greatest difficulties encountered by this company was in getting gears and pinions which would stand the tremendous wear and tear incident to the operation of their road. At first cast iron was tried, but it was soon seen that a much tougher and stronger metal must be used to stand the high speeds and give perfectly reliable results. After a careful review of the subject it was decided to place an order for gears and pinions of steel with the Midvale Steel Co., of Nicetown, Philadelphia. As these gentlemen are thorough steel makers, constantly fabricating high-power ordnance for both the army and navy, as well as manufacturers of castings, the Denver Railroad company may confidently look forward to the smooth and successful operation of this part of their plant. One of the great troubles with the steel casting of today is the fact that but very few makers of steel castings understand the manufacture of steel. We are pleased to place before our readers through the courtesy of the Midvale Steel Co. a cut of these gears together with a resume of their salient points. And although this illustration has previously appeared in other trade papers, it was not accompanied by any description of the casting, method of molding or strength of material used.

The pinions are 9 feet $3\frac{3}{8}$ inches pitch diameter, and 40 inches face. Each section when shipped weighed 10,500 lbs, making a total weight of 42,000 lbs for the pinion. The gear is 12 feet $9\frac{5}{8}$ inches pitch diameter, and 40 inches face. Each section having a shipped weight of 15,250, the total weight of the gear is 61,000 lbs.

The wheel itself contained eight pieces, only four being shown in the half wheel given in illustration, as this gives a view of but 20 inches of the face, the other half consisting likewise of four segments making another perfect wheel 20 inches in diameter, and these two when set on the shaft close together make the wheel of the size originally given.

Each was cast in four sections, as shown in engraving. The cut shows only one-half of the gear, the other half being exactly similar. The castings were made in dry sand molds from a pattern, the arms being formed by cores and the steel was run in through two gates entering the hub at the bottom of the mold. They were poured on the flat with the teeth in a vertical position and fed by four risers or shrinking heads on the hub and rim. The castings were made of open hearth steel and were well annealed.

Anyone possessing any knowledge of the steel foundry business will of course realize the care necessary in casting a wheel or section of a wheel of this size in order that the uneven shrinkage might be provided for, and the necessity of putting in plenty of metal to permit for thoroughly and evenly finishing.

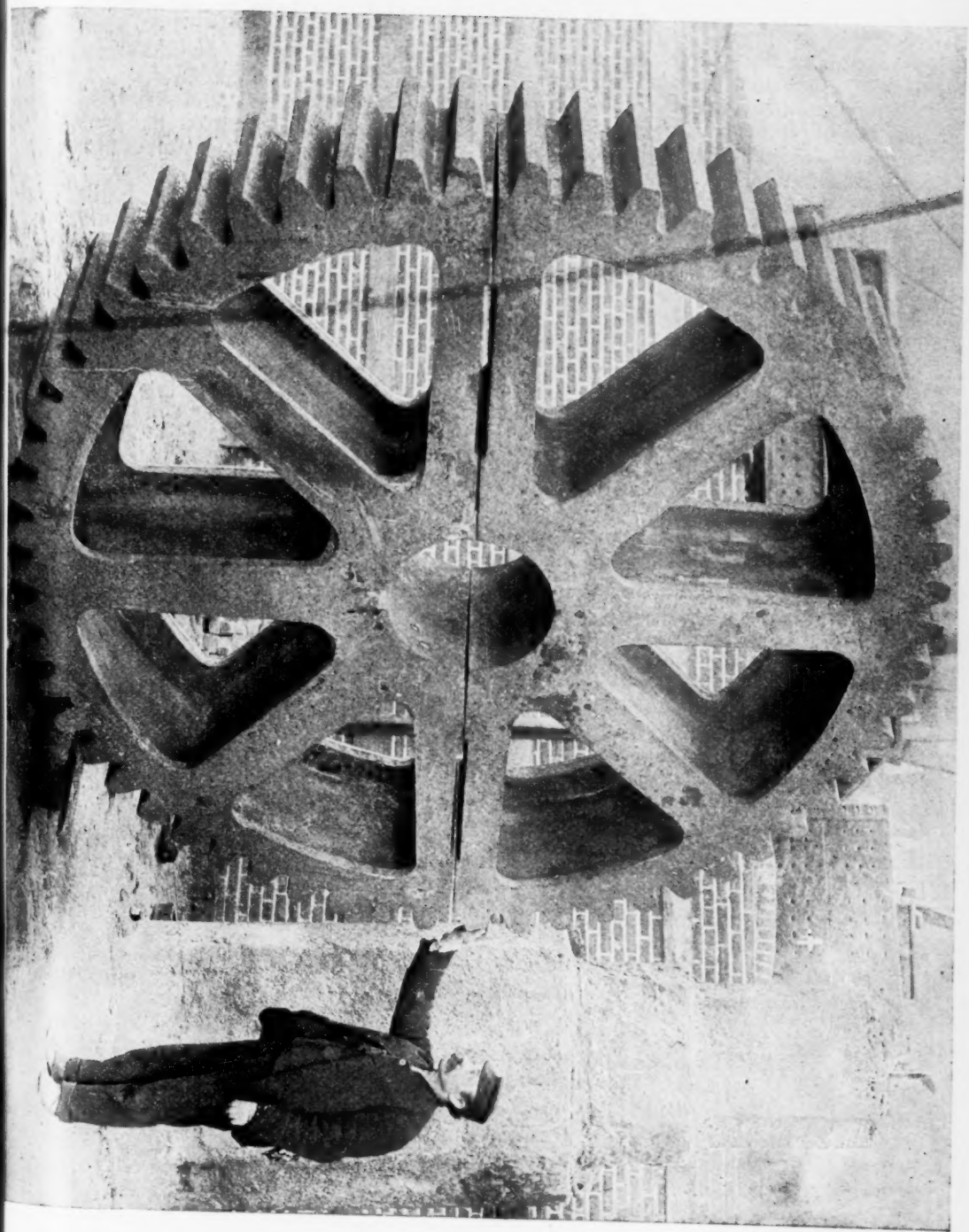
Test bars taken from the steel of which these castings were made gave the following results:

Tensile strength, 82,500 lbs per square inch.

Elastic limit, 45,000 lbs per square inch.

Extension, 26 per cent.

Contraction, 38.49 per cent.



A Large Cast Steel Wheel.

Chemistry in the Foundry.

W. J. KEEP.

AT the meetings of both the Philadelphia and the Western Foundrymen's Associations, the question has been argued, whether or not a chemist with an ordinary chemist's knowledge of foundry requirements, would be a money-making addition to a foundry plant.

Intelligent mixing of irons cannot be accomplished without the aid of chemistry, and conclusions must be reached by the united work of chemistry and physical experiment.

The latest conclusions are as follows:

The Fuel used in the cupola is often deficient in carbon, or heating power, yet the blast is always the same. It will do its work in proportion as it contains little or much ash.

Manganese, in the quantities found in ordinary merchantable pig iron, exerts no delaterious influence. It slightly hardens, and increases the shrinkage of the casting, but it does not make the iron white, or increase the chill. If in the casting it was 1½ or 2 per cent, it might be felt, but such an amount cannot be obtained from using ordinary cheap pig iron.

Phosphorus does no harm unless it reaches more than 1 per cent in the casting, and then it only weakens the iron, but this amount can hardly be obtained from ordinary pig iron. It does not make the casting white, or increase the chill. It slightly decreases shrinkage and makes the iron remain fluid a trifle longer, and lessens blowholes. It is not, however, of much benefit.

Sulphur can never exceed 0.10 of 1 per cent in the casting, and rarely exceeds 0.05 of 1 per cent. This amount does not exert any perceptable influence.

Carbon in pig iron will vary in amount, but such variation may be overlooked. The grayness of the iron is dependent on the percentage of silicon present.

Silicon is the only thing necessary to the founder, as all other things in cast-iron can be overlooked. If the shrinkage is not low enough, or the iron is too hard, add silicon. It remedies all other defects. There is no use for high-priced ferrosilicons, as any iron having from 4 to 6 per cent silicon with phosphorus not over 1 per cent is as good.

If the chemist understood this practical view of the case, he would never say that the casting contained too much combined carbon, and that manganese and sulphur and phosphorus caused combined carbon, and must therefore be watched. He would simply say there is not enough silicon.

The chemist is obliged to accept the statements of the books he has at hand. His analysis shows excessive combined carbon, and he finds this ascribed to manganese, sulphur and phosphorus.

Modern research has shown that silicon is the only needed variable, and that it is easily managed.

One chemist stated in a paper not long ago, that the profits in the foundry business must be very great, or founders would have been obliged to employ chemists before this.

He could not have been farther from the truth.

The fact is, the impurities, and in the proportions found in pig iron, are a necessity to the founder.

There are no narrow limits of proportions. A little more or less of any element makes no appreciable difference in the result. Changing the mixture to vary the silicon is all that is needed.

This is the reason why founders have been so successful.

It is not practical to purchase on guaranteed analyses. Such irons are not the cheap irons, and no furnace can make the two ends of the same pig alike, much less the iron made two days apart. No two car-loads are the same. The name of an iron is of little account unless it is an assurance that the mixture of ores are never varied.

A No. 3 pig, or scrap iron, with silicon added in the cupola, makes as good a casting as No. 1 or No. 2 pig.

It is simply a question of which mixture costs the least.

The analysis of a sample before purchasing, or from a pile in the yard, will not assure uniform castings.

A physical test can be made in an hour by the foreman, and the shrinkage will tell him whether his iron has the

right amount of silicon, and whether it is hard or soft, for hardness and shrinkage increase together.

To aid his judgement, a test for strength will tell whether changes in mixture are working in the right direction.

In making such tests, the most strict attention given should be to accuracy in all details.

We do not by any means wish to be understood as saying one word against chemical analysis.

When an iron is purchased from a reliable party the general average analysis can be obtained from such agent, and from the mixture in the cupola, it can be ascertained whether any weakness is due to high phosphorus or to insufficient silicon.

We are aware that if a chemist were to come down to a close argument, we should make some exceptions to the broad ground here taken.

For special purposes, irons which have a tendency to chill would be selected, or manganese would be added to give a hard wearing surface, but there are no fine lines in foundry work.

If a man with a thorough chemical education would learn to look at general tendencies, and not hold so closely to four figures of decimals, and accept the results of late research, he could adapt himself to practical foundry work and would be of great use. He would soon leave his laboratory and become the practical leader, and would only go back occasionally, to solve some problem that needs new light.

We know of one case where a chemist of this sort saved his firm $100 a day in the cost of their mixtures, but in such a case the chemist becomes an intelligent, practical man, and uses the best methods to accomplish an end.

We cannot have too much respect for chemistry. Practical research could do nothing without it, but after general conclusions are reached, then to be of use the chemist must become the practical metalurgist.

Progresss in the Science of Melting and Cupola Construction.

New Center-Blast Tuyer and Its Economical Advantages.

BY THOS. D. WEST.

[Read at the meeting of the Western Foundrymen's Association, at Chicago, Oct. 18.]

IT IS a question if in any of the industrial arts there has been so little improvement in the last forty years as in the cupola used for melting cast iron. It is not owing to the lack of effort toward improvement, for we find that there has been untiring energy and much capital expended in experimenting with different forms and principles in cupola construction, to reduce the ratio of fuel to iron, or, practically speaking, to the cost of melting. Today it is a point open for dispute if a better understanding of the science of "running a cupola" has not as much to do with its economical operation as any improvements in the construction of cupolas.

I think it will be admitted that little or no radical advance has been made in management until the advent of practical writings upon the melting of iron. As the chief pioneer in this we should all bow with respect to Dr. Edward Kirk, author of "Founding of Metals," a work published in 1877. Without a positive change in the principles of melting and construction of cupolas now in use, I do not see how it will be possible to make any greater advance in the matter of economy, which now means, according to the conditions of requirement, the use of one pound of fuel to melt from five to ten pounds of iron. I think it is now thoroughly understood what is true economy in the use of fuel, and why the same intelligent melter might be required to use one to five in one case, where one to ten would answer in another.

With our present methods, one field now presenting itself for the acquisition of knowledge in matters of melting and cast iron is in the chemical action taking place in the remelting of iron. I have been greatly interested in the papers and discussions emanating from this organization upon the question of chemis-

try, and think the subject of the utmost importance to many foundries. There are those that can get along without having chemical service, but they are very few who could not obtain practical benefit from the use of the knowledge now obtainable upon the question. I know that in the ingot department of our foundry we could not afford to abandon chemistry. Not only do we know the chemical qualities of every charge of iron that goes into our cupola, but also that of the coke. When running full, our heats range from fifty to seventy-five tons per day, and the product is analyzed and a record kept so that we are enabled to ascertain if anything is going wrong ane chemically compute what goes in and what comes out of the cupola.

The adoption of chemistry in our foundry was not a question of choice. We were compelled from self-defense to know what our product contained, as we found our customers often attributing short service in particular molds to excessive silicon or sulphur, when it was plainly not due to these causes. To protect ourselves against claims of this nature, as well as to insure uniform analyses, we found it necessary to know not only the analysis of our pig iron, but also of our product. Comparison of analysis with service naturally followed, which in time resulted in an elaborate system of records. It might be advisable to state here that in our practice we use all pig iron, and that such practice gives an advantage for obtaining reliable data that foundries purchasing scrap to mix with pig metal could not secure as readily. Generally speaking, purchased scrap iron is a miscellaneous collection of everything, and to attempt to know its chemical composition would generally involve so much labor and expense as to make it impracticable. With some scrap piles, by taking several samples and mixing their drillings so as to obtain an average, an analysis might often work very fairly; but such a case would be the exception to the rule. It would be best in such cases, when special results are desired, to abandon the use of scrap and use all pig iron.

The president of our company, Mr. Geo. H. Boyd, has formulated quite an elaborate system for recording the chemical and physical qualities of our irons and product coming from it. The way the subject is classified enables us to obtain some very valuable data. As an illustration we will take up the question of silicon and sulphur. Here we find, by remelting or by the action of the fuel and blast in the cupola, that we reduce the silicon from 0.1 of 1 per cent to 0.4 of 1 per cent, but this reduction is generally uniform. We think it is only through some radical change in manipulating the blast to the cupola it is caused to be reduced below 0.2 of 1 per cent. On the other hand, we will increase the sulphur one time 0.2 of 1 per cent, and perhaps the next 0.5 of 1 per cent, when using coke of same analysis and in uniform ratio to iron charged. The manipulation of the cupola alone seems to affect the sulphur to a greater degree than the silicon, for the silicon is generally reduced uniformly, while the sulphur seems to have no regularity about its increase; and I am inclined to think the varying temperature existing at time of melting is the main cause of the irregularity found in sulphur when same coke is being used. The Connellsville coke we use will average 0.80 in sulphur; the iron 1.50 silicon, .040 sulphur, manganese 0.34, phosphorus .092. The analysis of the above materials are given so as to enable anyone that might be inclined to do so to take the matter up and compare notes with us.

There is a large field for investigation in chemical matters for the founder to explore, and the information to be obtained will enlighten us upon many mysteries we now find ourselves at a loss to fathom. I do not wish it understood that we are wholly relying upon the chemical analysis of iron, for there is too much to be discovered in that line ere we can ignore the physical qualities of iron in judging of and attaining results. While cupola work is progressing in respect to chemistry, I think from my late efforts and results there will be further achievements in melting, barring what might come from the little explored region of electricity.

Before entering upon a description of my late experiments, I think a brief recital of different plans and principles that have been tried in various cupolas for the past fifty years would prove very beneficial in leading up to a ready understanding of the advantages the writer desires to set forth in illustrating the new principle which he has originated in experimenting with melting by means of what we will term a center blast.

An investigation of the experiments made in cupolas with a view to economy in fuel shows there have been many failures and we find most all plans imaginable have been tried. Europe far surpasses this country in originality and novelty of designs, but I question if America has not excelled in the points of good general utility. The first radical beneficial step we find to have taken is in the adoption of the "drop-bottom," an American invention. Ere this came in use, bottoms were composed of solid masonry or fire-proof material from the ground up to the spout, and in order to get the "dump" or refuse out of the cupola after a heat was finished the "front breast," being made large, would be knocked out and by means of pokers the refuse and cleanings would be raked out. I am led to believe that this plan is still being used in some parts of Europe today. From the adoption of the "drop-bottom," improvements have been mainly in the line of securing greater economy in the use of fuel. The most radical divergence from the common cupola has been caused by experiments in designs arranged as in the Woodward cupola which sought to create a blast economically by means of a steam jet blowing up the stack; also as in the Rirger cupola, which instead of forcing the blast upward reversed the order; then, again, as in cupolas arranged to utilize gas for a fuel. In examining some of the cupolas that have been tried one would surely think that if crooks and oddity had any virtue, perfect combustion would have been accomplished long ago. This may be secured, but we find more founders have faith in the common cupola. My definition of "common cupola" is one of plain cylindrical form having one or more rows of tuyers. The question of inside formation and illogical shapes given to cupolas have about ran their course of absurdity, and this has been helped by the late literature upon melting. We are rapidly advancing in understanding the principles and sciences involved in the proper construction of cupolas and melting, and today we find the only element of any value that has been grasped from out the chaos of ruined expectations in the construction of cupolas is that of economical combustion being attained by two or more rows of tuyers. In order that all may be able to follow this paper intelligently and understand the philosophy and advantages to be gained by "upper tuyers" we will first note the action of fuels in order to obtain perfect combustion. "According to Dolong 1 pound of carbon combining with the necessary quantity of oxygen to form carbonic acid develops 12,906 units of heat. The specific heat of cast being about 13, the melting point 2,190 degrees, and the coke containing 82 per cent of carbon, then to heat a ton of cast of a temperature of say 40 degrees to a temperature of 2,190 degrees, would require $\frac{2150 \times 2240 \times .13}{1\ 900 \times .82} = 59.1$ pounds coke. This is supposing that the whole of the carbon is converted into carbonic acid, but if by any means carbonic oxide is formed a very different result is obtained; then one pound of carbon to carbon oxide only evolves 4,453 units of heat. If, however, by admitting air above the zone where the oxide is formed we recover 4,478 units, this times 4,453 gives 8,931, which is a little over two-thirds of the available heat to be gotten out of one pound of carbon, allowing 10 per cent for moisture in the coke, ten per cent for radiation and 20 per cent for loss of heat passing off at the top of the cupola or 40 per cent in all, the amount of coke per ton of metal should not exceed 112 pounds although the actual consumption is as we have shown usually much higher."

The combination of carbon with oxygen or air blown through the lower tuyers produces carbonic acid gas in the bottom bed of fuel and this in passing up through fuel heated to incandescence takes up more carbon and is converted

into carbonic oxide gas. Now if the carbonic oxide can again have sufficient oxygen or air admitted to it we will again have carbonic acid or more nearly complete combustion, and by such alternate zones which at every repetition becomes less violent, we could if it were only practical to hit the right spot of the descending stock with the proper amount of air, almost achieve the theoretical figure of melting one ton of iron with 59 pounds of fuel as given in above table; but instead of that we consider if we can accomplish such with 200 pounds of fuel we are doing exceptionally good work.

We have cupolas figured to achieve the above results by combination in tuyers and in reality cupolas having two or more rows of tuyers can be the only ones properly entitled to the claim of being scientifically constructed as far as the admittance of blast is concerned. Were it only possible for the blast passing through their tuyers to penetrate to the center of the cupola and have an unmovable zone of fuel to play into, they might successfully accomplish the end intended, but as it is the results are but partial, it is a question if the extra burning out of the lining which two or more rows of tuyers cause by having more melting zones does not often more than compensate for what saving in fuel may be acquired.

The economy that is possible if two or more rows of tuyers could only be made to force its blast to the center of the cupola and at the right elevation, caused me two or three years ago to give thought to the subject and to desire to get nearer the theoretical figure than present cupolas were doing if it could be possible.

One plan after another suggested itself until the idea of a center blast came to me. Having two cupolas in our shop, I thought I would experiment with the smaller which is 40 inches inside diameter. Cutting a round nine-inch hole in the "drop-doors" we attached to the underside when the doors were propped up an eight-inch blast pipe. Inside the cupola and resting on the "drop doors" was placed a cylinder of ten inches diameter by eighteen inches in height on the outside of which were prickers protruding about 1½ inches so as to support a lining of clay. On the top of this cylinder was placed a clay cap supported by three pieces of fire brick so as to leave an opening 2½ inches high for the admittance of the blast. The outside tuyers were all stopped up and all the blast admitted to the cupola up through this center cylinder tuyer. The first heat was carried through with the same fuel as used with the old system of outside tuyers and resulted in giving hotter iron melted in about the same time. Several more heats were run off reducing the fuel each time and still giving iron hotter than with the old system. The most astonishing feature of the experiments was the little or no burning out of the cupola's lining. In fact the process seemed to cause a glazing effect that was beneficial to the lining.

The experiment in this small cupola resulted so favorably that we concluded to try the plan in our large cupola in connection with the outside tuyers, which we did after the plan illustrated by the cut herein shown. Before starting in to use this bottom center blast tuyer, we were not safe in trying to do better than one to seven or eight in fuel, as our metal came all from pig iron and had to "come down hot." With the combination of the center blast and outside tuyers we found we could obtain hot metal with one to ten or eleven, and I would state that the one to ten or eleven iron was often much hotter than the one to seven or eight melted with the old process, and it would often come so hot that it would take considerable scrap to cool it off before it would be wise to pour the metal. To say it would be as hot as stove molders would often care to use it would probably be the best way to convey an idea of its heat, and it might be well to state that the metal would be hotter at the end than at the beginning of the heat. The cupola men liked to use the device, as it made the work of chipping out and daubing up the cupola so much easier than in the old system, for in fact there would often be very little of such work to do. In my experimenting there were several plans tried, but the one recommended later on is the best and last one I am using with this

system. It cannot be but evident that with such a plan the blast is conveyed to the center of the cupola or body of fuel, where it should be to achieve the greatest results, and if the theoretical point in perfect combustion is ever to be reached it will be by some such system. Not only does this plan save fuel, but also the lining of cupolas, while the present methods or principles now used for accomplishing economy in fuel do so at a sacrifice to the lining; so much so as to make it in many cases a question if there is any economy in using "upper tuyers."

I know there are those that will wish to criticise the plan here presented, and say that had we used "upper tuyers" we would have accomplished the economy in fuel which we did with our new system. To all such I would say that by looking at the cut at N herein shown they can see that such was used, for the cupola as now shown is, as far as outside tuyers are concerned, used the same as when we could not do better than one to seven or eight. I know we read about melting one to ten or eleven and up as high as sixteen. I only wish to say that by the adoption of the plan here presented they should still do better, and not have what they save in fuel lost by cutting out the lining. No doubt many can by a glance at the drawing conceive at once the whole scheme of the plan, but I think most all would prefer a detailed description of the working of the system. A is an outside tuyer box made of ¼-inch wrought boiler plate, so as to make it light for dropping purpose. It is bolted only to one-half or section of the "drop doors." B is a peep-hole, arranged with isinglass, for the purpose of seeing if all is working well. C is a hinged cover having a hole for the bar cap supporter D. At E is a 1¼-inch hole stopped by a little pivot-swinging valve, so that if through the peep-hole B any leakage should be seen, this valve could be swung back to let the metal or refuse run out. It will be noticed that the tuyer box A is made of a taper, so that should slag-iron or refuse drop down into it, it could be readily relieved. The cylinder F is made of an inner and outer ring of ¼-inch boiler plate. The space G is filled with fire-clay. H shows angle iron, of which there are four pieces, for the purpose of supporting the round iron rings I. These and the angle irons are for holding and preventing the bagging of the fire-clay, which is daubed on over them to protect the cylinder F from the melting heat of the cupola. This clay would be put on after the cylinder is placed in position inside of the cupola, and dried by the burning up of the bed. It would be the better plan to have two cylinders, so as to have one all the time on hand for drying in an oven. One heat gave us trouble through lack of care when half through by the metal getting through the clay to the iron rings. K is a clay cap having a cast-iron prickered casting, as shown at M. The clay or ganister used for forming this cap K and daubing over the cylinder F should be of the best quality. The 1½-inch bar shown at D is in two sections, so as to enable its being pulled out before "dropping the bottom."

In cases where cupolas stand high the bar might often be worked in one piece. In placing the cap K on the cylinder my first plan was to let it rest down upon it and then after the blast was on and the iron commenced to melt, the jack screw R would be raised, thereby lifting of course the bar H and the cap K to make any width of opening at S for the admittance of the blast that would be thought wise. The raising of this cap up against the pressure of coke and iron gave us trouble at one heat through breaking off of the clay at the outer rim of the cap, so that after the cast was about two-thirds over the heat in the cupola had melted the casting M so as to cause a leakage down into the tuyer. We then tried another plan by letting the cap rest on three pieces of fire brick, one of which is seen at X, as done in the 40-inch cupola; these being equally divided the blast would have ample room to find space for entrance between the top of the cylinder F and the cap K, as at S. In order to prevent the blast from entering this tuyer ere the iron commenced melting, we used a damper as seen at Fig. 2, which would be placed up in the cylinder F at a point about level with H and which consisted

of a jointed bar the same as seen at D, having at its end a round piece of ½-inch boiler plate, as at O, having prickers riveted into it for the purpose of holding clay to keep the damper from getting hot and also bring the clay down when the damper would be removed or the blast allowed to enter the cupola. This arrangement of course did not require any jack-screwing. We simply had the bar D protrude below the tuyer box cover G about two inches so that a swinging catch attached to this cover supported the rod D, and in removing this damper we simply knocked the catch away and the damper fell down, bringing its clay with it. Of course, with arrangement of damper, the center supports or guides P P for the bar D, when the raising plan was used, were removed. This plan was a decided improvement over raising the cap, and worked all right. The reason for it not being desirable to admit the blast through the center tuyer ere the iron commenced to melt was, in the first place, to have the bottom outside tuyers get the carbonic acid gas well started from the lower fuel before admitting oxygen to combine with the carbon oxide created in the fuel above the bottom tuyers, upon the same principle that it is desirable to do so with upper outside tuyers. In the second place it greatly aids in preventing the tuyer hanging up when the bottom is dropped, with large heats.

The cap K, as shown, was made larger than the cylinder F so as to prevent the dropping metal from falling or getting into the opening at S during the heat. It will be noticed that the point of entrance for blast at S is higher than the bottom outside tuyers. This is done to achieve the end accomplished by upper outside tuyers in admitting oxygen to combine with the carbonic oxide in turning it into carbonic acid gas, thereby making more complete combustion.

In making connections for the blast with the center tuyer box A, conditions will vary the plan to be adopted. The attachable pipe coming to this tuyer and connected at T should be an independent one coming directly from the main blast pipe and not from any of the side tuyers or wind boxes, and a damper should be arranged in this main-side branch pipe so that the pressure of the center blast can be regulated independent of the outside blast. The cupola shown has twelve outside tuyers, six of them being lower tuyers 3x16, and six of them upper tuyeres two inches in diameter. The width of opening for the center blast admitting of air was about 2½ inches. In "dropping the bottom" after heavy heats we sometimes found that the center tuyer would hang up, but by a little rapping on its protruding end with bars it would come down, and leave a good "dump" or "bottom-dropped cupola." In using this tuyer by itself or in combination with outside tuyers it is essential in large heats to flux a cupola well and run the slag off. By letting slag remain in the cupola it readily chills around the tuyers and thereby causes "bunging" or "hanging up," and it might be well also to state that the outside tuyers should be kept well open so that the blast can find easy delivery to the end of the heat through them. At the start the blast should not pass through the center tuyer with with any more force than necessary to counterbalance the inside wind pressure.

If this system should be adopted in cupolas that are to run steady over ten hours, like those in steel works, I would like to hear of some one trying the cylinder F (instead of as here shown), having it constructed of all fire brick, every other course being tied with a thin plate of boiler or cast iron, the edges of which standing back so as to be protected by a covering of clay. These rings should not be over 3-8 thickness. The idea is to make sure of the heat not causing any cracks to occur in the brick tuyer or burn the edges of the rings while the blast is on. By well tying the brick work or "breaking its courses" it might stand well without the use of the iron rings. I have tried an all fire-clay cylinder tile baked in a fire-brick kiln, but it did not prove a success as it was cracked and gave us trouble from leakage. For ordinary cupola work I know that with care and judgment the plan here illustrated, and having the two cylinders as above suggested, could be made to work successfully, and all who

try it will find they can save fuel and the cutting of their lining. The latter with some firms is a very costly affair. Of course, in starting in to try this system one is not expected at the very first heat to charge with a radical change in using less fuel, but gradually trying less every heat until they find by trial just how low they can get. At the start you can at least depend on reducing the bed

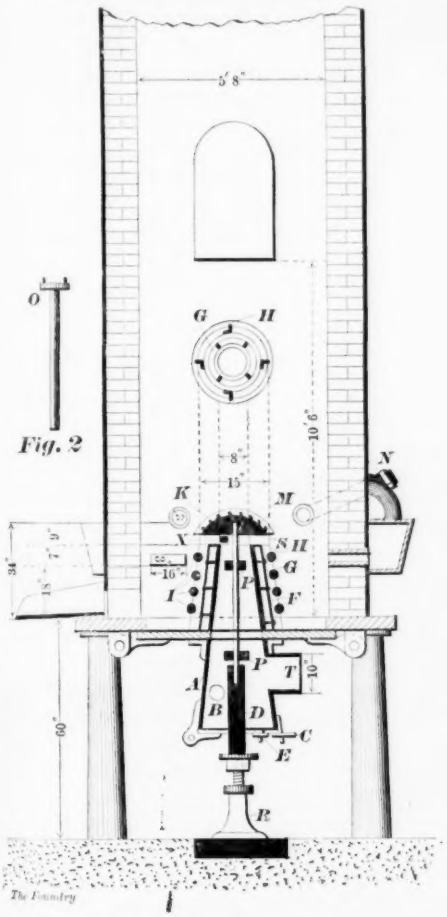


Fig. 2

in bulk whatever the bulk of your center tuyer may occupy, and between charges have 20 per cent less fuel. I know that in our 68-inch cupola we reduced the bed after trials from 3,000 to 2,100 pounds, and in charges from 900 down to 500. The iron we place on the bed is 8,000 pounds, and between charges 6,000 pounds, and as stated in the first part of this paper, our heats run from 50 to 70 tons. We are still experimenting in this line, but as business has been so dull for the last three months, there has been but little opportunity to go ahead and compute the results.

A remarkable coincidence in this experimenting is that after I had been laboring with the new system, thinking the idea was alone with myself, a letter came from the far north showing that another foundryman was likewise experimenting—Mr. Thos. H. Widdowson, of Mankato, Minn., who wrote me on this subject after I had been at work upwards of a year. I have mailed Mr. Widdowson a notice of the reading of this paper and invited him to be present to discuss the merits of our respective operations.

I have been receiving THE FOUNDRY for the past year and am much pleased with it. Inclosed find subscription for another year. Wishing you success, I am, Yours truly,

HENRY WRIGLEY,
Danbury, Conn.

THE FOUNDRYMENS' ASSOCIATION

THE regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club, Philadelphia, on Wednesday, October 4. The chair was occupied by Thos. Devlin, of Thos. Devlin & Co., Philadelphia. In the absence of the secretary, Howard Evans, the duties of that official devolved upon H. C. Vansant, of Morris, Tasker & Co., Incorporated, Philadelphia. The minutes of the last meeting were read and approved. The Executive Committee made no report, as there had been no meeting of that body since the last meeting of the association.

Mr. Vansant read a letter received from Prof. MacAlister, of the Drexel Institute, Philadelphia, in regard to the arrangement for chemists' services discussed at the last meeting, in which was expressed a belief that arrangements could be made at the institute for the making of determinations on satisfactory terms.

Mr. Vansant also read a letter from Congressman Bingham, acknowledging receipt of a copy of the resolution passed by the association at its July meeting, and stating that he was in full accord with the policy therein expressed in regard to the repeal of the silver purchasing clause of the Sherman act.

L. B. Whitney, of A. Whitney & Sons, Philadelphia, representing the car wheel section of the Price Committee, reported that prices were never lower than at present

There were no reports from the remaining sections of the committee.

Stanley G. Flagg, Jr., of Stanley G. Flagg & Co Philadelphia, reported that he had had an interview with Professor Spangler, of the Mechanical Engineering department of the University of Pennsylvania, at which the professor stated that, in response to a letter he had received from the secretary of the association, he had taken up with Professor Smith the question of undertaking analytical tests for the members of the association. Professor Smith said that the university would be only too glad to aid the association in any way possible, but at present their laboratories were full, and if an additional force was required extra expense would be incurred. Professor Spangler intimated that, in the event of the work being done at the university, no profit would be expected; but charges, simply sufficient to cover expenses, would be made, and that the association should guarantee the expenses of the work to the extent of say $650 per year, of which amount $500 would be applied in payment for the services of a man who would be at the disposal of the association at all times, and the remaining $150 would be used for incidental expenses. It was estimated that the entire expense would amount to about $650. He (Mr. Flagg) told Professor Spangler that the association was not yet ready to act in the matter, but that he would report the suggestion to this meeting. As far as mechanical tests were concerned Professor Spangler said that if samples were sent to his department he would willingly make any test required, free of any charge whatever, and that he should consider such calls upon his department favors to himself. The employment of a man especially for the work of making tests was, the professor thought, rendered necessary by the fact that, when samples were sent to the department for analysis, analyses would be required the same day as sent; and in case all the young men in the department were employed on other analytical work which could not be left, the service would be unsatisfactory. By employing a man exclusively for the work, tests could be made promptly. Professor Smith had hoped to be present at this meeting to discuss the matter, but another engagement prevented his attendance.

Upon motion it was resolved that personal invitations be sent to Professors Smith, Spangler and MacAlister to be present at the next meeting of the association for the purpose of further discussing the matter.

Mr. Vansant read a letter from the secretary of the Western Foundrymen's Association, dated September 25, stating that at a meeting of that association held the previous Wednesday it had been decided that if possible and advisable their October meeting would be held in the rooms of the Associated Engineering Societies in the Mining Building at the World's Fair, in which case an effort would be made to have the day of the meeting recognized as an official "Foundrymen's Day" by the exposition, and to have the Mining Building open in the evening; that arrangements would also be made to have one or two important papers read; that invitations would be sent very widely throughout the West, and the Philadelphia organization would be invited to attend, and asking how many founders from the Philadelphia district would attend, and for suggestions regarding the plan.

As Mr. Evans, the secretary of the association, was in Chicago, a motion was made that the matter be referred to him with instructions to do what in his judgment he considered best in the interests of the association; and that Mr. Whitney be directed to write to Mr. Evans informing him of this arrangement.

THE FOUNDRY

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

Published Monthly by

"The Foundry Publishing Co."

172 Griswold St. DETROIT, MICH.

DETROIT, OCT. 10TH, 1893.

Entered at the Post Office at Detroit, Mich., as second-class matter.

SUBSCRIPTION—One Dollar and fifty cents per year in advance in United States, Canada or Mexico; one dollar and seventy-five cents per year to all other countries. May be sent by express, draft, money order, registered letter or postage stamps. Single copies, 15c

CLUB RATES—Eight or more subscriptions sent at one time, $1.25 per year each. Cash to accompany order.

Advertising rates furnished upon application

SUBSCRIBERS can have address changed as often as desired

IF YOU FAIL to receive your paper promptly, please notify us.

THE FOUNDRY is issued promptly on the tenth of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

The Detroit News Company,

Publishers' Agents, Detroit, Mich.

DEALERS SUPPLIED BY

The Albany News Company, Albany, N. Y.
The Baltimore NewsCompany, Baltimore, Md.
The Brooklyn News Company, N. Y.
The Buffalo News Company, Buffalo, N. Y.
The Central News Company, Philadelphia, Pa.
The Cincinnati News Company, Cincinnati, Ohio.
The Cleveland News Company, Cleveland, Ohio.
The Colorado News Company, Denver Colorado.
The Detroit News Company, Detroit, Mich.
The Minnesota News Company, St. Paul, Minn.
The Montreal News Company, Montreal, Canada.
The National News Company, New York, N. Y.
The Newark News Company, Newark, N. J.
The New Orleans News Company, New Orleans, La.
The New England News Company, Boston, Mass.
The New York News Company, New York, N. Y.
The Northern News Company, Troy, N. Y.
The Omaha News Company, Omaha, Neb.
The Pittsburg News Company, Pittsburg, Pa.
The Rhode Island News Company, Providence, R. I.
The San Francisco News Company, San Francisco, Cal.
The South West News Company, Kansas City, Mo.
The St. Louis News Company, St. Louis, Mo.
The Toronto News Company, Toronto, Ontario, Canada.
The Washington News Company, Washington, D. C.
The Western News Company, Chicago, Ill
The Williamsburg News Company, Brooklyn, E. D., N.Y.
The Wisconsin News Company, Milwaukee, Wis.

Talc as a "Filler."

TALC is largely used for foundry facings, being fireproof. Talc powder is invaluable for this purpose. For the benefit of some it may be well to state that by "foundry facing" is meant the substance used to mold metal in. For example, when a casting is to be made, an impression is first made in a box of fine sand with a mold "form." This indentation is then filled with talc powder, which is again indented with the mold. The result is that the last indenture has a lining of fireproof talc, which prevents the molten metal from burning the surrounding sand or turning it to glass, and at the same time gives the casting a smooth, polished surface.

The above is clipped from a practical(?) article in the *Cincinnati Times*, on the subject of Talc, which, as most of our readers know, is used sometimes in the manufacture of foundry facings. We doubt if there is any business in the country which is as universal as the business about which so very little generally is known and so much ignorance exists. We can see the amused expression that cannot fail to pass over the countenance of a reader of THE FOUNDRY as he learns for the first time that "foundry facing is the substance used to mold metal in," and that the beginning of the operation consists of making an impression with a "mold form," etc., but when it comes to filling this mold or form or whatever the intelligent writer would call it, with talc we really must protest because it looks too much like an advertisement from some enterprising talc dealer. Then again, what a marvelous thing it really must be to prevent the molten metal from converting the sand into glass. The attention of glass manufacturers is respectfully called to this item, as doubtless they will be interested in this new process. But how about the man who has made hundreds of tons of castings and never used any talc in his life, and stranger yet has never known his sand heaps to turn to glass once "a la" the Arabian Nights. If there are any of our readers who are not fully posted on this mysterious and all-powerful article we would say that it is not nearly as dangerous as the foregoing would lead him to believe.

It is mined principally in North Carolina, and it is said that the best found in America, if not in the world, is to be had there in Cherokee county.

Foundrymen know, of course, that soapstone has long been used, especially in stove foundries, to either mix with the mineral facing before it is placed in the mold, or better still, it has of late years been incorporated in the finer

grade of facings in the right proportions before leaving the mill. They do not all know though that talc if pure bears the same relation to soapstone that marble does to limestone, being finer, smoother and possesses to a far greater degree all those attributes that make soapstone valuable. One of its chief virtues lies in its being non-combustible, or fire-proof, to a marvelous degree, and previous to the discovery of fire-clay in its present state talc was largely used to line chimneys and furnaces. Its uses nowadays, however, are legion, as it finds a market all along the line from the foundrymen to the members of the fair sex who want the very best thing in the way of a harmless and yet good face powder, or the vain individual who calls it into use to aid him to get a No. 10 foot into a No. 2 shoe.

An analysis of a perfect specimen of talc gives the following result: Water, 4.65; silica, 62.50; magnesia, 31.20; iron oxide, 0.82; alumina, 0.51; calcium, a trace, and of manganese, a trace. Total, 99.68.

The Scrap Heap.

Recently the editor of the *Cincinnati Times-Star* published the following:

MEETING HERE OF THE INTERNATIONAL IRON MOLDERS' COMMITTEE.

The Executive Board of the International Iron Molders' Union began a three or four days' session at headquarters in this city yesterday. The members present were: Martin Fox, president; John Campbell, of Quincy, Ill., Richard F. Daly, of Brooklyn, N. Y.; James P. Diamond, of Nashville, Tenn., and Patrick Costello, of New Haven, Conn. The only member absent was R. H. Metcalf, of Cleveland, O. The business transacted was chiefly of a routine nature, accounts examined, grievances considered, etc. While the order is in a strong condition, financially speaking, the state of trade is not at all satisfactory, and now that the stringency of the times is over an effort will be made to secure better wages, as in many places reductions of 10 or more per cent were made the past summer. The policy of the executive officers has been against strikes under the circumstances, but now a more vigorous policy may be pursued. In comparison with other trades wages are very low, and the feeling is that a decided stand may result in the betterment of the condition of the trade.

* * *

Armed with this clipping the editor of the *American Artisan*, of Chicago, called on Henry Cribben, president of the Stove Founders' National Defense Association and asked him how much credence was to be placed in it.

"The matter does not affect the members of the Defense Association in the least," said Mr. Cribben. "For the very simple reason that the members of the association have made no reductions in molders' wages the past summer. In fact the S. F. N. D. A. has done more to maintain the standard of molders' wages in eight years than the molders themselves have done in the last twenty-five years. There was not a decade between the closing of the war and the formation of the Defense Association that molders' wages were not cut from one to three times, the reductions ranging from 10 to 20 per cent. Moreover, the Iron Molders' Union is under contract to work under existing conditions until the 1st of April next. Reductions have been made in the wages paid machinery molders, and the 'more vigorous policy' intimated at in the clipping probably refers to machinery molding, and not to stove molding at all."

There is a whole sermon, in fact several of them, in the foregoing statement of Mr. Cribben. In the first place it would seem that the Iron Molders' Union have a yearly agreement with the stove manufacturers, which obviates entirely any possibility of trouble occurring of any kind. It prevents any restless spirits from promoting disturbances in an effort to get higher wages and restrains any over-zealous employer from attempting to get an unfair advantage by a reduction that would be quickly followed by every other manufacturer, leaving them the same as before, while the molder alone would get the small end of the stick. It is more than certain that had such an agreement not existed during the present year, the molders' wages in many foundries would have suffered a reduction, and there is more than a small show of reason for the statement made by Mr. Cribben to the effect that the S. F. N. D. A. has done its share to maintain the molders' wages.

If by any scheme possible the machinery and bench molders of the country could do anything to bring about a like result in their case, what a change we would have in the foundry industry, when that greatest evil of all, the strike, would be only a memory.

A Little History.

Edward Bok, writing in the November issue of the *Ladies' Home Journal*, says: "As is the

first year in the life of the child one of its most trying times, so is that period the most hazardous in the life of a periodical."

* * *

The same number contains a large amount of most interesting reading matter relative to the life and history of the most successful magazine in the world reviewed from the point of circulation and influence, as the *Ladies' Home Journal* has a positive circulation of over 72,000 copies.

* * *

This is preparatory to a few remarks of a personal nature concerning THE FOUNDRY. A little over one year ago this paper came into existence, not so much to fill the proverbial and traditional "long-felt want" as to first create the field and fill it afterwards.

* * *

The foundry business has a distinct individuality of its own, and it is after all about as universal as any branch of the iron trade, but somehow or other foundrymen have never been accorded the place in popular estimation or even in the mechanical world that the importance of the industry or the ability of many of those engaged in it so justly entitle it to.

* * *

This is probably owing largely to the fact that the founder's business is a sort of intermediate one, and as he is found half way between the designer or patternmaker on the one hand and the finisher or machinist on the other, he fails to receive the recognition due him from the fact that in looking at the finished machine, engine, or even stove, we are apt to involuntarily think of the genius who designed it or the mechanic who put it together, without taking into account the brains, muscle or ingenuity utilized in molding, pouring and turning out the castings, light or heavy, of which it is constituted.

* * *

Then, again, the founder's surroundings are against him. The common idea associates the name "molder" with a "pile of dirt" which he shovels at irregular intervals into a box, and by some unknown process makes a "hole," into which melted iron is poured. The molder himself is seen in a costume that is as marvelous as it is original at times, face blackened with dirt, arms sometimes bare and black too, occasionally down on his knees surrounded by the implements of his calling, or hid in some corner bespattered with claywash and loam, laying bricks.

* * *

This, of course, is far from romantic and in marked contrast to the patternmaker in his clean white shirt, or the machinist in his bright overall suit, and has much to do with the widespread ignorance that exists concerning this important business, and if the truth must be told with the inferior rank it evidently takes among other industries.

* * *

Added to all this is the fact that the trade press has fallen largely into the common error, and with perhaps one or two exceptions none of the trade papers have seen fit to devote any more than a corner occasionally to foundry items, and then only too often make the serious mistake of publishing matter that their editors would not have permitted to appear had they been at all posted on the foundry business.

* * *

These, then, are some of the reasons that led up to the present enterprise of publishing a paper mainly in the interest of this hitherto neglected field, and is also the key to the unparalleled success we have had, when it is considered that the capital invested was so small that were the sum mentioned it would seem incredulous.

* * *

We have had, however, one source of revenue from the very outset of our career, usually denied similar enterprises, and that has been our phenomenally large receipts from subscriptions, because every intelligent and progressive foundryman who saw the paper wanted it.

* * *

It usually takes a number of years to achieve the degree of success and greatness that is ours at the end of our first, and keeping in mind that progress and improvement are always demanded, we feel warranted in saying something about our future.

* * *

Commencing with the December number, a few improvements will be noticed in this paper, as arrangements are now being completed that will warrant our undertaking some measures, having for their object the furnishing of much better value to our subscribers than we have hitherto done or that has ever been done by a paper of its age.

We shall spare no pains or expense during 1894 to improve each month, and feel assured that there are thousands in America who will appreciate our enterprise, and hope that the foundry business may be aided a trifle at least in assuming the degree of independence and importance that its merits so justly entitle it to.

* * *

We shall not further enlarge upon this matter. Now, the future will tell its own story. In December we will inaugurate a new policy, which will then be formally announced. Wait for it.

TOOK EIGHT MEDALS.—The Winslow Bros. Company, of Chicago, are rejoicing because every one of the eight exhibits they entered for competition at the World's Fair have carried off medals, something that is as unusual as it is complimentary to this enterprising firm.

The articles upon which these awards were granted were:

A large hand-forged carriage gateway.
Hammered leaf wrought iron work.
Iron stairs, railings, newels.
Duplex electro-plating on iron.
Metal mantels and attachments.
Elevator enclosures.

THE COMMERCIAL TRAVELER.—On the occasion of a railroad disaster, a salesman of the Joseph Dixon Crucible Co., of Jersey City, N. J., was a passenger on the train. His presence of mind saved from more than slight injury a well-known clergyman. Subsequently the reverend doctor wrote the company complimenting the salesman, and expressed himself as follows regarding the traveling fraternity:

" * * * Years ago, in a lecture, I remarked that the good Samaritan was a commercial tourist (drummer). If a man ever wakes up about midnight with the bottom side of his coach in the direction of the stars, he will think that I am right. The drummer of Samaria had the best of oil and wine. The drummer of Jersey City had the best of pencils and the kindest of hearts. The iron horse will dash and the electric light will soon flash through the land where Christ and his apostles once held sweet converse in regard to who was really our neighbor. Methinks I hear the conductor at Jerusalem say, 'All aboard for Jericho. Passengers for Moab take seats in the front car.' The train may be wrecked. If so, I venture to say that the ubiquitous drummer will be the first and the last to administer to the wounded and dying, while the fat priest and bloated Levite will either be asleep in the Pullman, waiting for the black porter to call them up, or whining about the loss of a silk umbrella or gilt-edged prayer book. The Jersey City drummer will never be known on earth as extensively as the Samaritan, but I am certain that his name will stand as high and his reward be as great in that land where all men will be rewarded according to the deeds of mercy which they perform in this. I know that many of the commercial agents have some habits in error. Yet I want it distinctly understood that the sexton of the church where I am pastor must always invite the commercial traveler to a front seat."

"Relation of a Foreman to His Men."

Mr. Editor:

IN looking over THE FOUNDRY for September I became very much interested in the article written by C. A. B. in the "relation of the workman to his foreman." He does not seem to think that as a rule molders do consider their relation to their foreman.

He also says that this relation has a bearing in a commercial way, which works for or against the success of the shop; this I admit, and I also claim that the majority of molders do work for this success.

I believe that they are almost universally industrious whenever and wherever they receive a just remuneration for their labor, and that they know that the success of the shop means their success.

"C. A. B." says that the foreman hates to drive the men. This I grant, but very often the employer is driving the foreman and then he drives the men and they drive one another. The men do not do this because they feel unkindly toward their fellow workmen, but because the struggle for existence is so great, and very often a molder has four or five depending upon him for bread, and Shakespeare tells us that "conscience doth make cowards of us all." Again he says that it has occurred to him that molders should devote more time to reading, studying and reflecting.

In this I fully agree with him, but did it ever occur to "C. A. B." that after working ten hours in a foundry a man was hardly in the condition to do any of these? Besides, he may have plenty of reflecting to do if anything has

gone wrong with his day's work—a thing which often happens in the foundry. He says that the apprentice boy is the future bulwark of the foundry. I say that he should be, but I don't believe that he will, because there are very few foundries now where a boy can learn the whole trade of molding. Specialty is the order of the day. The poor boys go into the shop believing that they are learning the trade only to find later on that they have only learned a part of it, for we have the stove molder, the car-wheel molder, the agricultural implement molder and many others; for this reason I fail to see where the apprentice can hope to be the bulwark of the trade. I believe he will be its slave.

We already see this tendency among men who can only work at one kind of work, and who are therefore willing to submit to anything to keep their places, knowing how hard it would be for them to find another job if they lost their present one.

The molders in this country have not half the spirit of those in Great Britain. There they have had only nine hours for twenty years or more and stop work every Saturday at noon. Here they have to work much harder for ten hours or more I believe that there are many just employers and good foremen who would like to see the things come to pass which "C. A. B." writes about, and as a molder, so do I, but until the employers recognize the right of existence of trade unions much time and money will be spent fighting each other, which could be used to much better advantage for the advancement of both. Trades unions have come to stay, and the more opposition they receive the nearer they get to socialism. Labor may be honorable, but modern civilization neither honors nor guards it, and it has never acknowledged it as a friend of or existing as an integral part of society, or standing within the circle of fraternity.

Labor, then, like an omnipotent principal exerts itself to shake off the manacles with which it is bound, and to become free.

Watts, Colberrs, Arkwright, Bacon, Locke, LePlace and Newton have enlightened the world, but had it not been for the ingenious and industrious mechanic, the foundation would have been of little value had not practical work done the rest. In what country has labor attained that position in our glorious modern civilization which its rank and dignity should command? Has it not everywhere to submit to the insolence of wealth?

With best wishes for "master and man," I will say good-night. J. A.

STANDARD BABBIT.—Melt separately 4 parts copper, 12 bancatin, 8 rigulus of antimony. After fusion add 12 parts of tin. The antimony should be mixed with the first portion of the tin, and the copper added after taking the melting pot from the fire. The surface of the mixture should be protected against oxidation by a covering of powdered charcoal.

This constitutes the "hardening," and babbitt metal proper is made by fusing 1 part of this hardening with 2 parts of tin.

A CORRECTION.—In our October issue we inserted an item that had come to us through some of the channels that newspapers use, to the effect that the Union Foundry and Machine Co., of Pittsburg, Pa., had settled a law suit between it and some of its employees by paying the wages and costs for which some of the men had sued. This statement it appears is somewhat erroneous. The firm took the position that they were not compelled to pay their employees oftener than the regular pay day, while some of the men, who voluntarily left their employment and were not discharged, demanded it on the spot, but not receiving it commenced suit. In this contention the judge upheld the firm, and rightly too, we think, for while many establishments do pay employees whenever they leave, there are many more who do not, and any right thinking man will concede that it is necessary, especially in large establishments that some system should be observed and rules made to properly govern all such matters.

THE FOUNDRY has given me many evenings of pleasant reading matter, and I wish it contained more than it does. If you can also state the names of some good books on the subject of "Chemistry of Iron" pertaining to foundry practice it will oblige, Yours truly,

JOHN H. GAVIN,

With Wolff Manufacturing Co., Chicago, Ill.

"I PRESUME, my good fellow, you are a laborer?" said a lawyer to a plainly dressed witness.

"You are right; I am a workman, sir," replied the witness, who was a civil engineer.

"Familiar with the use of pick, shovel and spade, I presume?"

"To some extent. Those are not the princi-

pal implements of my trade, though."

"Perhaps you will condescend to enlighten me as to your principal implements?"

"It is hardly worth while. You don't understand their nature or use."

"Probably not," loftily, "but I insist on knowing what they are."

"Brains."—*Bradford Daily Argus.*

Messrs. Byram & Co., Detroit, Mich., continue to make shipments of the well-known Colliau Cupola Furnace and have recently furnished Messrs. Wm. Glendenning & Son, Montreal, P. Q.; The Eastwood Wire Manufacturing Co, Belleville, N. J.; two for the Ingersoll Sergeant Drill Co., New York, N. Y., for their new shops at Easton, Pa.; the second one for Messrs. F. E. Merer & Bros., Ashland, O., and the Clinton Plow Co., Clinton, Mich.

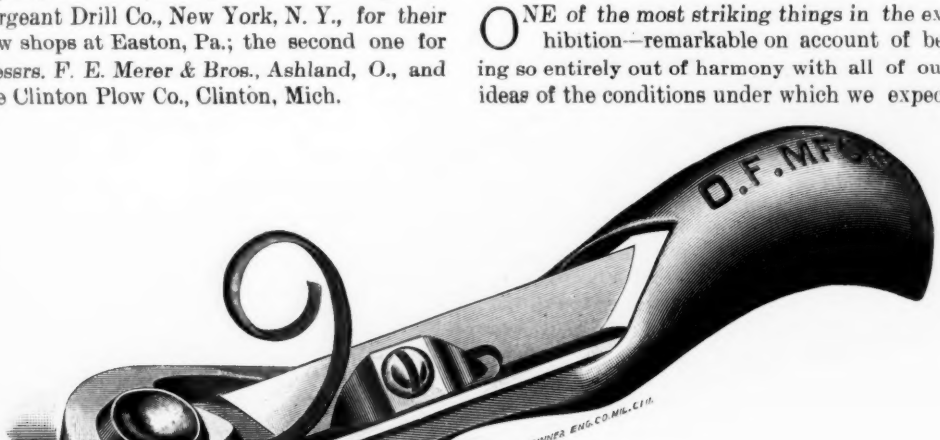
make $10 worth of fillets. Generally there are enough cuttings from leather belting around any pattern shop to make all the fillets required. Circulars, price list, etc., on application.

You will find inclosed my subscription for another year. I am so well pleased with THE FOUNDRY that I would not be without it. Wishing you the full enjoyment of a well-merited success, I am, Yours, etc.,

H. W. JOHNSON,
Buffalo, N. Y

The Water-Pail Forge.

ONE of the most striking things in the exhibition—remarkable on account of being so entirely out of harmony with all of our ideas of the conditions under which we expect to see heat generated—is the apparatus to be seen in this exhibit which may be appropriately termed the "water-pail forge." This consists of an ordinary wooden pail filled with water, into which is dipped a metal plate connected with one terminal of the electric circuit. The other terminal is attached to a pair of blacksmith's tongs, with which the operator picks up and holds the piece of metal to be heated. Immediately upon his plunging this into the water the liquid begins to sputter and the metal to glow, until in a few seconds it is brought to a welding heat and is then speedily melted. The heating is so rapid that neither the water nor the metal a few inches away are more than slightly warmed. This curious phenomenon appears to be due to the localization of the resistance of the circuit at the surface of the heated metal by the interposition of a layer of hydrogen between the metal and the liquid.



New Tool for Patternmakers.

"THERE is nothing like leather" for fillets, so says Donald Frazer, of the Donald Frazer Manufacturing Co., of Milwaukee, Wis., himself a practical and widely known patternmaker with an extensive experience.

With the aid of the tool which he has recently patented and placed on the market any patternmaker is enabled to make his own fillets of any size and shape to suit the job in hand.

As shown in the accompanying cut, the knife is made double ended, reversible and adjustable, one end being designed for fillets for ordinary square corners, and the other end for corners where a very flat fillet is required. The very finest fillets can be made by the aid of this tool from harness scrap, such as can be bought at any harness shop for about 2 cents a pound, and 25 cents' worth of scrap leather will

This is the explanation offered by two Belgian engineers who recently brought out the process abroad with apparently no knowledge of its prior use in this country.—*From Electricity at the World's Fair, by Charles M. Lungren, in The Popular Science Monthly for November.*

The important subject of physical culture is not considered as it ought to be by the majority of men and women, and there is almost absolute ignorance of the make-up of the body on the part of even intelligent people, although health, beauty, and success depend largely on the treatment given to the body. Mental acquirements are blindly worshipped, while the essential question of health receives little thought, and hence it is almost impossible to find men in the ordinary walks of active life, at middle age, who do not complain of impaired health and want of vital force.—*Lippincott's for November.*

Outing for November is rich with the lore of sport in many lands. Football and yachting are, naturally, prominent features, and there are two complete stories, "Imagination," by Edgar Fawcett, and "The Dunworth Crow," by E. M. Weyer. The number is a strong one, and, as usual, is finely illustrated. The contents are as follows: "Imagination," by Edgar Fawcett; "Wild Sport in Costa Rica," by J. J. Peatfield; "The Dunworth Crow," by E. M. Weyer; "Down the Teche in a Cat-rig," by A. B. Paine; "Lenz's World Tour Awheel;" "Football, Retrospective and Prospective," by Walter Camp; "Duck Shooting in California," by Bruce Douglas; "The Cradle of the English Cutter," by Capt. A. J. Kenealy; "Trapping and Home-made Traps," by Ed. W. Sandys; "A Fox Hunt on the Little Obed," by Minnie W. Armstrong; "The Government Scout," by Capt. Jack Crawford; "Team Racing," by S. Scoville, Jr.; "The National Guard of Pennsylvania," by Capt. C. A. Booth; "The Victory of the Vigilant," by Capt. A. J. Kenealy, and the usual editorials, poems, records, etc.

WHICH WON THE PRIZE?—Three students of the Ecole des Beaux Arts, Marseilles, were talking in a cafe.

"My dear fellow," said one "I painted the other day a little piece of pine wood in imitation of marble so perfectly that it sank to the bottom of the water."

"Pooh," said another, "Yesterday I suspended my thermometer on the easel that holds my 'View of the Polar Regions.' It fell at once to twenty below zero."

"That's nothing," said the last; "my portrait of the marquis is so life-like that it has to be shaved twice a week."

Books, Exchanges and Catalogues.

THE *Donald Frazer Manufacturing Co.*, of Milwaukee, Wis., have issued a couple of neat catalogues of their patternmakers' specialties. One of them is nicely printed in colors and refers exclusively to their pattern letters, of which this company makes a specialty, and carry a large stock at all times.

We are indebted to the E. P. Allis Co., of Milwaukee, Wis., for a large, handsomely illustrated book, giving a number of views of their celebrated works and of many of the large lumber and flour milling establishments erected by them in various parts of the country.

Robert MacKellar's Sons, proprietors of the Peekskill Facing Mills, Peekskill, N. Y., send us a neat little leaflet of their foundry specialties. This is one of the very oldest establishments of its kind in America, having been established in 1844 and until recently managed by its founder, Robert MacKellar.

Schwab & Sercombe, of Milwaukee, Wis., seem to be justly proud of a catalogue of their Gilt-Edge Furnaces recently issued. Its main feature and one which cannot fail to have weight with an intending purchaser is the unusually large number of illustrations of handsome residences heated by them, and as an evidence of the superiority of their furnaces they appear as just so many unaswerable arguments.

We have received two large and handsomely illustrated catalogues issued by the Kilbourne & Jacobs Manufacturing Co., descriptive of their line of barrows, trucks, etc., as this concern claims to be the largest of their kind in the world and makes an immense variety of appliances, many of them of especial adaptability to foundry purposes, such as charging barrows, pig-iron barrows, core-oven carriages, pipe trucks. Every progressive foundry should send for their catalogue.

NO HURRY.—Eaton Saltzer—Where are those oysters I ordered on the half shell?

Waiter—Don't get impatient, sah; we're dreffle sho't on shells, but yo're next.—*Truth.*

Enclosed please find subscription for THE FOUNDRY for the ensuing year. Also one for one of the boys.

I am a little late in sending it, but assure you that I wouldn't be without it for double the cost as I consider it just what the trade needs, and that in time all live men will recognize it for what it is worth. Am happy to say that business is very good with us in all departments and has been all through the dull period.

Yours, etc.,
L. N. PERO,

Foreman Poughkeepsie Foundry and Machine Co.

Our Chicago Letter.

(*Special to* THE FOUNDRY.)

THE outlook for Chicago at present is anything but encouraging. The majority of foundries are working short time with little prospect for improvement. When the financial stringency first struck Chicago there was apparently plenty of work but no money to do it with. We now find it the reverse—money easier but no work to be had. Foundries having a specialty are better off than the jobbing shops, but they have nothing to boast of, as they are making only what little they need from day to day. "What shall I put my men on in the morning?" is the question that confronts them each night. Occasionally a foundry here and and there will experience a little spurt for a few days, but there is nothing of any duration. They all say if they can keep their present force at work through the winter they will be satisfied. Scarcity of work and keen competition has brought the price of castings down very low. If business does not pick up, the foundries of Chicago will experience the hardest winter they have seen in a good many years. All are hopeful that the morrow will show an improvement. Business may pick up before spring but it is doubtful. Business with Fraser & Chalmer is good. They have on quite a large force and are working full time.

Eureka Foundry, which was run by Wiltshire & Graf and closed by the sheriff, will be opened again by Kolben Johnson, its former proprietor.

Sargent & Co., formerly of the Congden Brake-Shoe Co., report business good.

W. H. Chenoweth Co., which went into the hands of an assignee, have arranged with their creditors for a settlement and have petitioned the court to remove the assignee.

Vanderpoel & Co. are running three heats a week.

Daudhy Iron Works have shut down.

Hansel & Elcock are working every day.

E. F. Harris' business is slow.

Railroad Supply Foundry Co.'s business is fair, and running every day.

The Vulcan Iron Works' business is slow, and they expect it to stay so all winter.

Vierling & McDowell's business is slow. They run awhile and shut down awhile.

Wier & Craig, manufacturers of plumbers' supplies, report business slow.

John Featherstone's Sons' business is some better than last month.

The Link Belt Machine Co. are running their foundry two and three days a week.

The Atlas Foundry's business is fair, but not anything to boast of. They are making Adams & Westlake's work.

T. M. Hugh says he is as busy as any of them, and has gone into the manufacture of sewer covers.

Farrant & Ramsey's business is very quiet. If they can keep their present force at work through the winter they will be satisfied.

R. M. Eddy's business is very fair. Have a nice set of men which they would like to keep on through the winter.

Holmes & Pyott are making cast iron work for the new Stock Exchange building at La-Salle and Washington streets.

Dawson Bros., manufacturers of mantels and grates, are working half force, molding every day and casting three times a week.

Butler Street Foundry's business is slack. The stove foundries are waiting for a cold snap and unless they get it soon they will have a poor fall trade.

The Crane Co. report some little improvement. Are still working eight hours a day, five days a week in all departments excepting one, in which they are working 59 hours a week.

M. Brucker, manufacturer of stove repairs says business is picking up and expects a good trade. Owing to the hard times people will not buy new stoves but will repair their old ones.

King & Andrews have added to their foundry a plant for the manufacture of semi-steel by the McDowell process. This department is known as the Semi-Steel Co. They have contracts with the Standard Oil Co., Wheeler & Tappen, and the North Chicago Street Railway Company.

A. Bolter & Son are quite busy running full time and ten hours a day.

F. E. Roberts Co. are still in the hands of an assignee. The shop closed down and there is no prospect of opening.

Wells & French, car builders, have been closed down during the month of October, and will resume November 1.

The Chicago Foundry Co., which went into the hands of a receiver five months ago, are still closed down

Hansen & Saltenberger have opened the old Humboldt Foundry at 931 Fairfield avenue. They make a specialty of hotel ranges and light gray iron castings.

Lake Shore Foundry reports business slow.

South Halstead Street Iron Works have the ornamental work for the New York Life Insurance building at LaSalle and Monroe streets.

The Henry Roos Foundry Co. report business slow. Have just completed contract for the Lake street "L," on which they have had six or seven men working for the past four months.

Turner & Dickenson, who are in the hands of a receiver, are running, having made an offer of settlement to their creditors, which, if accepted, will bring them out of their financial trouble all right.

Bouton Foundry Co., which went into the hands of an assignee, have been running to finish up the contracts they had on hand when they made the assignment. These contracts are now completed and they will close down. There are some reports of a reorganization but nothing definite.

Business with the J. W. Reedy Elevator Co. is very quiet. H. S. V.

Pittsburg and Vicinity.

(*Special to* THE FOUNDRY.)

THE A. Garrison Foundry Co., of Pittsburg, has its foundry and machine shops running, but not very full. Business is reported as brightening somewhat.

The Powell Valley Foundry, at Waynesville, Pa., has started up and is in active operation.

The Lewis Foundry and Machine Co., of Pittsburg, has resumed operations after a shutdown of several days.

The Glover Iron Foundry Co., of New Castle, Pa., is busy filling large orders for annealing boxes, housings and chimney rolls.

The Fisher Engine, Foundry and Machine Works, of Pittsburg, is being run part time with a reduced force.

The iron and steel foundries of the Pennsylvania Steel Co., at Steelton, Pa., are being operated rather full, considering the dull season.

The Marshall Foundry and Construction Co., of Pittsburg, is kept running on a number of small orders, which it has booked.

The stove foundry plant of Graff & Co., at Sharon, Pa., was recently shut down owing to a scarcity of orders.

The Springfield Foundry Co., of Pittsburg, is running part time with a reduced force. The company had been operating its plant to a fuller extent, but orders became very scarce, necessitating the suspension of some men.

In Other Districts.

THE Chattanooga Car and Foundry Co., of Chattanooga, Tenn., is reported as being very busy. It recently filled a large contract for car repairs for the Cincinnati Southern railway.

The St. Louis (Mo.) Iron and Machine Works have their foundry well filled with work.

The Indiana Car & Foundry Co., of Indianapolis, is being operated mainly on repair work.

The Smead Foundry, at Toledo, O., has resumed work after a long idleness.

Haines & Harvey are building a large foundry plant at Gibson, Ill.

Louis Sears, of Ashland, O., has perfected plans for the erection of a foundry at that place.

The foundry department of the Rankin & Fritsch Foundry and Machine Co., of St. Louis, Mo., is being run with a full force on full time.

The Ashboro (N. C.) Wood and Iron Co. will soon commence the erection of a large foundry and machine shop there.

The Birmingham (Conn.) Iron Foundry, founders and machinists, continue to run with nearly a full complement of hands.

J. L. Aeuchbacher, of Atlanta, Ga., recently sold his foundry business to G. A. Aeuchbacher and C. C. Gzendorff.

The first cook stove ever molded in Aroostook, Me., was recently turned out by the Houlton Foundry and Machine Co.

The Phillips & Buttorff Foundry, at Nashville, Tenn., which for some time was making about half time, is again running full and with a full complement of hands.

The Hopkins Foundry, at Ellsworth, Me., was recently supplied with a new engine and power elevator.

Jacob Kritch, of Port Townsend, Wash., has entered into negotiations for the establishment of a large brass foundry at St. Paul, Minn.

The foundry plant of D. J. Bolenger, at Waynesboro, O., was damaged by fire recently to the extent of $5,000.

The Standard Iron Co., of St. Louis, Mo., is at work on many orders for fire plugs, pulleys, etc.

The Ford & Donnelly Foundry, at Kokomo, Ind., is being fitted up with new machinery, etc.

The Wellston (O.) foundry has closed down owing to mining suspension, the operators being obliged to cancel orders for mine cars, etc.

The foundry department of the North & Judd Manufacturing Co., at New Britain, Conn., has resumed operations after a shutdown of eleven weeks.

The Foundry known as the Ulims Iron Works Co., at New Orleans, La., was badly damaged by fire some time ago. The principal loss is on patterns and stock.

A new 15-ton cupola was recently added to the foundry plant of F. E. Myers & Brother, of Ashland, O., which will increase the capacity nearly one-half.

The Standard Iron Co.'s foundry at Superior, Wis., is running on full time, with a large force of men. The company recently put in additional machinery for making corrugated mill rolls.

Work at the foundry plant of the Bridge & Beach Manufacturing Co., of St. Louis, continues in full force and there is no let up in activity.

Aultman, Miller & Co., of Akron, O., have opened their new foundry plant, which is 400x100 feet. The plant is well fitted with machinery of the most modern kind, and will have a daily capacity of 55 tons of melted iron.

M. Donovan & Co., of Toledo, O., have made an addition (60x30) to their foundry plant, and a 50x30 addition to their blacksmith shop. By these improvements they expect to double the capacity of the plant.

Business Improving.

TRADE as a general thing has during the past few weeks shown several signs of improvement, and while no changes are perceptible in the foundry industry, yet it is surely coming, and we hear during the past fortnight many encouraging things from dealers in foundry supplies and equipments of every sort. No surer indication of the future could be secured as far as this particular business is concerned, as they unquestionably keep closer to the trade than any one else.

Remarkable Coincidence.

ELSEWHERE appears an article read by Mr. Thomas D. West at the Western Foundrymen's Association, October 18 last, in which he gives a detailed account of some experiments made by him with a view of introducing the blast to a cupola through the bottom, and by a tuyer that permitted the passage of the blast into the cupola in the center of the "bed," or first charge of fuel. Mr. West worked for a year or two at the idea and its development, and early this year thought of patenting it, even going so far as to write to a prominent and well-known patent solicitor in Sharon, Pa., for his opinion as to whether the idea was a patentable one or not, and he replied in a letter which we have seen, giving his opinion that it was, after having a careful examination made by the Hon. Ellis Spear at Washington, D. C. Some time after this Mr. West received a letter from a well-known foundryman, Mr. Thomas H. Widdowson, of Mankato, Minn., informing him (Mr. West) that Mr. Widdowson had also been for many months at work on exactly the same thing, and giving the results of his experiments. Mr. West makes appropriate notice of this in his paper read in Chicago. Now, this was a coincidence pure and simple, and an extraordinary one at that, but the remarkable part of it all is that this same center-blast cupola had been patented August 13, 1867, No. 67651, by B. H. Hibler and the Pittsburg & McKeesport Car Co., at which time it was thoroughly tried with a saving of one-third in the fuel used, it being afterward introduced and successfully tried by Mr. Hibler, who was a practical foundryman, in the Excelsior Stove Works, Quincy, Ill. THE FOUNDRY heard a rumor of these facts, and wrote Mr. West on the subject with the result that we have received from him a mass of evidence proving conclusively that he could not possibly have heard of Mr. Hibler's patent, including the original correspondence with the patent attorneys, etc.

The reason Mr. West did not further at-

tempt to patent the idea was because he had something else in view that, it appeared to him, would be still better, and while the records show that Mr. Hibler was evidently first with his idea, yet it is also clear that both Mr. Widdowson and Mr. West were of the opinion that they were first with it.

That it has not come into more general use is owing probably to the awkwardness and disadvantage of the plan proposed of getting the blast to the place through the bottom, but we will have more to say on this subject in our next issue.

The Bower-Barff Process.

OF recent years, and more so during 1893 than any of its predecessors, we have read much of the Bower-Barff process of coating iron and steel where it is desired to have it preserve all its original sharpness and beauty in spite of exposure to air or under varying atmospheric conditions.

When treated this way the use of all paints, varnishes and shellacs are dispensed with and a much finer surface secured than would be possible by their use. In connection with this process the Bower-Barff Rustless Iron Co., of New Pork, has issued a neatly printed pamphlet of forty pages, in two colors, on "Rustless Iron and Steel," in which the process of coating iron and steel with an enamel of magnetic oxide of iron is fully described. The method is set forth as follows:

The Bower-Barff method accomplishes the formation of magnetic oxide upon iron articles by subjecting them successfully to the action of highly heated air and carbonic oxide gas derived from coal fires. The hot air converts the metallic surface into red oxide of iron, which is reduced to the black or magnetic oxide by the gas, and the process is then completed by the action of superheated steam. This steam also produces the black oxide and penetrates to parts which might have been passed over by the gas. It also toughens the coating.

The process is applicable to all forms of cast, malleable and wrought iron and steel, where the surfaces are not subjected to severe friction, nor injured by subsequent manipulation.

Surfaces of iron and steel treated by the processes present a pleasing blue-gray or blue-black color, and preserve the sharp outline of artistic and well-executed designs; while, if the articles are polished before treatment, the result of the oxidation is a lustrous, ebony black finish, which is highly prized for its beautiful effect.

Its application to architectural iron work, both exterior and interior, is not by any means confined to the preservation of the iron or prevention of rust, but is likewise used for beautifying the work, and a new impetus has thus been given to the use of iron for decorative and architectural work. It is now no longer necessary to disfigure costly artistic work by paint or other so-called anti-rust coatings.

The process has a record of nearly ten years in the United States, and its practical value is fully established. Treated articles have been exposed for years to sea water and to the most varied atmospheric conditions without the slightest deterioration.

Magnetic oxide withstands the action of many brines, alkalies, sulphureted gases, and weak, organic acids, but it is gradually dissolved by sulphuric and hydrochloric and other powerful acids. The corroding action of these acids, however, is considerably retarded on "rustless" iron, and hence such iron has been successfully used in chemical works where it was exposed to strong acid fumes.

A Large Casting Made of Gun Metal.

THE Crown Smelting Company, one of the few industries which is running full-handed in Chester, Pa., has just turned out one of the largest gun-metal castings ever made in this country. The casting is a pump bucket for the St. Louis Water Works, and is made for a sub contractor. The casting, which was made by Robert Stinson, is a beauty, there not being a flaw or blemish of the slightest character in it. It is cylinder-shaped, resembling a large tub with cross ribs and a hub. It is about three feet high and five feet in diameter and will weigh about 5,200 pounds.

The contract called for a casting that

would stand 30,000 pounds tensile strain, with 15 per cent elongation at 8 inches diameter. The metal was melted in ten crucibles in as many furnaces, and after being melted was transferred into a large ladle, under the supervision of William Hill, the foreman.

America's Oldest Stove.

IF there is one thing more than another for which the World's Fair, lately closed at Chicago, will be always remembered, it will be for the way in which it forcibly impressed upon the minds of those who were privileged to

— THE —
OLDEST STOVE IN AMERICA.
This stove was brought from France and placed in the first established Convent in
QUEBEC, 1693.
BY THE COURTESY OF
MR. CHARLES F. GUNTHER.

attend it and who gave the subject any thought at all, the fact that at no age of the world has such material progress been made as in the art, science and manufacturing industries of the Nineteenth century. The exhibition contained thousands of object lessons in this respect, and whether seen in the holes of the Cliff-dwellers, the lessons of the anthropological, or the crude instruments for making music, old sewing machines, old agricultural implements, early typewriters, ancient locomotives, etc., the lessons were the same. In nothing, perhaps, was the contrast greater than in the splendid exhibit of the Michigan Stove Company, which we illustrated last month, and where among other things was shown the oldest stove in America.

Foundrymen who are in the habit of declaring that there was but little progress made in their business were at all events particularly interested in the reproduction which we present herewith, showing the progress that has been made in just 200 years.

It is of the old box type, quite ornamental, everything considered, and strangest of all was poured with flat gates, part of them being left still adhering to the casting and appearing on the outside. By examining it closely a portion of the gate can be seen on the top near the front end as well as on the side just underneath the oval ornament. It was put together much as stoves are put together nowadays, the great difference being, of course, in the excessive weight of the plates, being from one-half to three-quarters of an inch thick.

It shows a certain originality of design, and judging from the casting, the molder of the seventeenth century had no reason to be ashamed of his handiwork.

Ratio of Fuel to Iron.

BY S. BOLLAND.

(*Written for* THE FOUNDRY.)

RATIO of fuel to iron means the proportion rate of fuel burned to melt a given quantity of iron, as 1 to 5, or 1 to 12, indicating that 5 pounds of iron is melted with an expenditure of 1 pound of fuel, in the first instance, the latter indicating that 12 pounds is the quantity of iron melted with the same amount of fuel. Any attempt to formulate absolute rules to be observed by the cupola man at all foundries alike must assuredly result in extreme disappointment, as nearly every place has its own special needs and requirements, which can be successfully met only by intelligent observation and persistent effort on the part of the cupola man or his superiors. For this reason comparisons relating to the economics of melting iron at different foundries are of no real value, disappointment and loss being sure to attend any attempt to appropriate the systems of others, which may in all probability have been founded on experiences diametrically opposite to our own.

Any conceit we may have indulged in because of our ability to melt iron at the ratio of 1 to 10 for the line of castings we produce, must be forever dissipated when he discovers that the exceedingly low temperature of such iron would render it utterly valueless for the light castings produced by our neighbor, who, for this reason must necessarily use more fuel to meet his case successfully. The foundry melting a standard gray pig with first-class scrap should undoubtedly melt their iron down with greater regularity and with much less fuel than where perhaps unwieldy and promiscuous scrap with a slight admixture of pig is the iron charged.

Quality of fuel affects results perhaps more than anything else; if poor, a greater amount must be used to obtain the requisite quantity of carbon. This, of course, increases the bulk between charges and requires extra time for its consumption, while the superfluous, impure substances, as slate, etc., yield a viscous slag which interferes in no small degree with the regular process of melting, retarding it always. Even when all other things are favorable, the pressure of blast and care bestowed on apparatus will always exert an influence for better or worse proportionate to the amount of intelligence brought to bear upon such important details. Leaky pipes, and fitful and uncertain blast means extra fuel and delay in melting operations.

Construction of the cupola and its location, with reference to adverse wind currents, and draft, is sufficient in some instances to mar effectually the best efforts of the cupola man, interfering as it does with the first efforts to ignite the fire, and thus precluding all possibility of an evenly burned stock, a forerunner sometimes of endless subsequent vexations and delays. The unfairness of comparing the performance of cupolas laboring under these and kindred disadvantages with others of faultless construction and suitable location will be apparent.

The wastefulness attending melting small heats in cupolas designed for more extended operations is made plain by the following: Suppose a 44-inch cupola is employed, for a heat of 12,060 pounds, the amount of fuel used including bed, being 2,140 pounds, the ratio would be 1 fuel to 5.63 iron melted. Now, increase the heat by six additional charges of iron to 37,440 pounds, maintaining the same ratio of fuel between the charges as before; this gives 4,960 pounds total fuel used, and the ratio is now 1 to 7.53. These are only a few of the things to be considered when comparisons are made.

It may be a subject for remark that such a firm is melting iron with a much lower ratio of fuel to iron than another, and much annoyance is caused by this undisputed fact, but all this would perhaps be modified if careful investigation was instituted. Possibly this distinguished firm is melting carefully selected irons of the same mixture every day without deviation all the year round, a state of things eminently conducive to a perfect practice, while those with whom they have been compared are, owing to the numerous and sometimes unpleasant changes in the nature and quality of the castings made, compelled to change their mixtures often, and more than once during the same heat sometimes.

Means for rapid transit, or close proximity of the cupola to the molds which are to be poured, will favor metal of a low temperature being melted, thus allowing a diminished ratio of fuel. But if facilities for conveying are limited and the molds far removed, it is incumbent that hotter metal be provided to compensate for the extra time occupied in handling. This increased temperature can only be obtained by increasing the ratio of fuel.

The preceding represents in some measure a few of the reasons for the high ratio of fuel to iron as necessitated in foundries which are unfavorably circumstanced as described; still, without doubt there is considerable waste of fuel almost everywhere that might be remedied if rigid investigation by qualified practitioners were established. Cupolas now yielding unsatisfactory results at many places might be changed to the best of their kind if those in charge of them were compelled to learn the importance of placing every charge of fuel and iron in the cupola systematically and precise. This, of course can only be done by the cupola man who knows that in order to retain the heat within the cupola and not have it wasted up the stack, more than ordinary attention must be paid to a favorable disposition of the materials charged, and further, that to insure regularity in both speed and fluidity every pound of such material should be carefully weighed. By this means alone can he pursue a course of safe experimental practice, the results of which if carefully noted, will furnish him with all the knowledge essential for supplying metal from his cupola at all times the exact temperature demanded, and without fear of disappointment. No reliance can be placed on any firm or method of melting that does not include a correct proportioning of the fuel and iron at every charge.

Besides this it is incumbent on the cupola man that he carefully observe the action of his tuyers, changing the form from time to time, raising or lowering them, increasing or diminishing their number, or if the tuyers be continuous, trying the effect of a gradual contraction or expansion from their original width. Expansion of tuyer area with no increase in wind pressure will soften the blast, while contracting them will have the effect of creating a cutting blast, if original wind pressure is maintained. By observing results from these several changes, as well as increasing and decreasing wind pressure in the

blast pipes, he may arrive at the very best practice possible for the cupola he manages, and the ratio of fuel may be reduced intelligently to the lowest possible rate consistent with the actual requirements of the foundry.

Much, if not all, of the annoyance and loss consequent on melting inferior irons which include large quantities of the meanest machinery, stove plate scrap, etc., in cupolas of moderate capacity may be obviated by a persistent adoption of the fluxing method. Usually when large proportions of such iron is melted in the cupolas above mentioned, the heat is short-lived and unsatisfactory; but if a suitable flux is used, the dirt in the iron intimately associates with it and forms a thin liquid slag which, by means of a slag hole placed a short distance below the tuyers, can be run off at pleasure, and so continue the melting uninterruptedly for an indefinite space of time.

L. S. Brown, of the Springfield Facing Mills, Springfield, Mass., is nothing if not a hustler. Though only in the foundry supply business a few years, he has succeeded in establishing a reputation for fair dealing and honest goods that he is deservedly proud of.

As a sample of his latest enterprise we note the fact that while at the World's Fair recently, Mr. Brown secured the entire graphite exhibit of Ceylon and New South Wales. Those who remember seeing their splendid exhibits in the Mining Building will feel like congratulating Mr. Brown on his enterprise.

New Foundry Enterprises.

Pierce & Co. will establish a brass foundry in Bay City, Mich.

Messrs. Carson & Anderson are starting a new foundry in Austin, Minn.

George Harley, of Poughkeepsie, N. Y., is opening a new foundry in Springfield, O.

Jacob Kritch, of Port Townsend Wash., will start a brass foundry in St. Paul, Minn.

The Dowden Manufacturing Co. think of starting a foundry in Prairie City, Iowa.

The Ontario Malleable Iron Co., of Oshawa, Ont., is adding a large, new molding and milling room to its plant.

The Co-operative Foundry, Machine and Repair shops have been started at Charleston, S. C., with a capital of $10,000.

A Double-Header.

THE attention of every one of our readers is respectfully called to the advertisement of the Cleveland Facing Mills, on pages 4 and 5. This concern believes first of all that it pays to make a good article, and in the second place that it is a good plan to let the world know it. They do a little careful, judicious advertising where they think it will do the most good, and it is no small compliment to THE FOUNDRY that they pay us in this issue by taking two pages. Their idea is that if one page pays, two pages should pay more, as permitting more display, and the publishing of more evidence in support of what they claim.

THE FOUNDRY.—A sprightly publication, devoted to the foundry business in general, has by the perseverance of its managers and the worth and attractiveness of its general make-up, firmly established itself as a necessity with the foundrymen of the country. None in the business need be at a loss for information, as its pages contain the latest, which, together with illustrations, advertisements, etc., make it a most desirable acquisition to foundry literature.

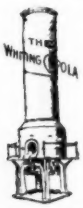
The Fire Fiend.

The brass foundry of Mims & Co., at New Orleans, La., was destroyed by fire on the evening of October 18.

The Enterprise Foundry, Rochester, N. Y., suffered damage by fire to the extent of $2,000, October 20.

The foundry of the Lincoln Stove and Furnace Co., in the State Penitentiary at Lincoln, Neb., was totally destroyed by fire on the evening of October 27.

J.H. WHITING, PRES'T & TREASURER G.A. TRUE, SEC'Y & ENGINEER S.T. JOHNSTON, GEN'L AGENT



DETROIT: MAIN OFFICE & WORKS, MICH. AVE. & D. & B.C.R.R.
CHICAGO: OFFICE, 62 WEST JACKSON STREET
CABLE ADDRESS "CUPOLA."

Detroit Foundry Equipment Co.

MANUFACTURERS OF

Whiting's Improved Car Wheel Foundry Plant.

General Foundry Outfitters.

FOUNDRY LABOR SAVING DEVICES.
THE WHITING CUPOLA,
IMPROVED GEARED LADLES,
ELECTRIC, STEAM, BELT AND HAND POWER
CRANES & DERRICKS,
RESERVOIRS, ELEVATORS,
TUMBLERS, TRUCKS, FLASKS,
SAND SIFTERS, CHILLS &c.
CASTINGS OF ALL KINDS.

Detroit, Mich., March 1, 1893.

Foundry Publishing Co.,

City.

Gentlemen:-

We enclose check covering price of our advertisement for last quarter. You may continue it in same space until further notice.

We trace a good many of our inquiries for Whiting Cupolas, Cranes and Ladles directly to your Journal, and consider it an effective medium through which to reach the foundry trade.

Kindly return voucher promptly, and oblige,

Yours very respectfully,

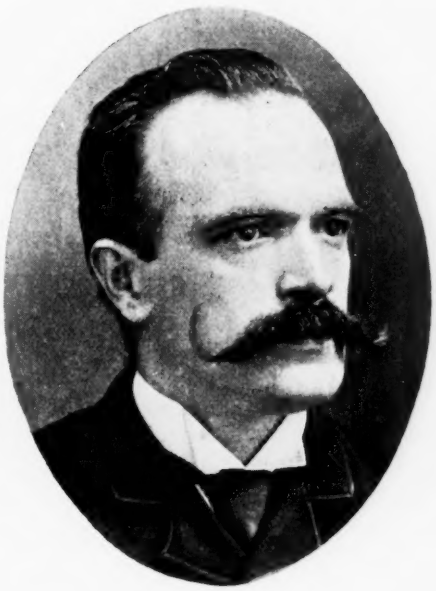
Detroit Foundry Equipment Co.

By Geo. A. True --Sec'y.

The Detroit Foundry Equipment Company were one of the very first to advertise in THE FOUNDRY, and have had their reward as evidenced in the letter produced above. They have been in business long enough to know a good thing when they see it and know how to take advantage of every desirable medium to push themselves to the front.

Francis Hurtubise.

IN the city of Montreal, the metropolis of Canada, is located what is said to be one of the largest, if not the largest foundry in the Dominion, the subject of our sketch being its well-known manager. Francis Hurtubise was born on the 5th of February, 1851, in Montreal, his father being a Canadian and his mother an English woman. After an education at the Bishops' Academy, Montreal, he entered a commission merchant's office, and later took a position as a bookkeeper with Day & Deblois, foundrymen, in May, 1870, remaining eight years, and in May of 1878 engaging with the well-known firm of E. Chanteloup. The latter soon noticing the energy and good will of his employee, thought it to his advantage to give him a thorough education in all branches of the business, and accordingly he passed consecutively from one branch to another until he had gone through them all, including iron and brass foundry and blacksmith shop, iron and brass finishing, pattern making, etc., in 1886 taking the full management and keeping until the death of Mr. Chanteloup in 1890. The latter just previous to his death named Mr. Hurtubise together with two other gentlemen as executors,, but these two shortly after dying also, left the entire business in the hands of Mr. Hurtubise, and as they employ between 300 and 400 hands and do a very large variety of work, it can readily be seen that he is kept busy.



FRANCIS HURTUBISE.

Mr. Hurtubise is possessed of an indomnitable will, a never-tiring store of energy and is withal courteous, approachable, and kind with all with whom he is brought into contact.

---

*President's Address to the Foundrymen's Association, Nov. 1893.

TODAY is the third anniversary of our association. I avail myself of this occasion to briefly address you upon our condition, and to state my views as to its future conduct and policy.

During the past year we have continued to grow steadily both in membership and stability. We are gradually uniting the foundrymen throughout the country for their common interests. We have set the example for the creation of similar associations in other and distant sections of the country, and our members are experiencing the beneficial effects of the unity of action, due to organization, and thus the first and most important result has been attained.

We have, during the year, informally discussed the desirability of combining all similar associations that may exist, or be formed throughout the country, under one parent head, to and from which all matters affecting our welfare radiate. That such an organization, national in character, would be of vital importance, none of us will deny, and it remains but to determine the details and methods to effect this.

I would suggest that after we have passed through the present depressed state of business, a call be issued by this association for a congress of the different organizations, besides to foundrymen in general, to meet at some central point for the purpose of forming a na-

tional organization, of which the local associations shall form chapters or subordinate branches. The local associations to be independent of each other, but acting in unity with and through the parent association, from which all principal matters shall emanate.

The parent body to be composed of representatives from the various chapters to be elected by the respective chapters annually. Each chapter to be entitled to one representative for any fraction of each hundred bonafide members.

These representatives to elect a president, vice-president, secretary and treasurer at an annual convention held at different points from year to year. These officers, besides five members elected at these meetings, to constitute an executive committee who shall meet monthly and act upon all matters affecting the interests of the association.

The expenses of the parent body to be borne by the chapters, pro rata, according to the number of representatives.

I advance the foregoing as mere suggestions, with the hope that the importance of the subject will be appreciated and fully discussed.

* * * * * *

It has occurred to me that possibly among the causes for the excessive competition in our business is the variable judgment applied in classifying work, and the liberty so often permitted unscrupulous parties to vary from the specifications, always to the disadvantage of bonafide bidders, and tending to inferior work.

Especially is this the case with municipal work, the quality and rates paid being really deplorable. We, as an association, should insist on a rigid inspection, which if properly applied would soon correct the evil.

The benefits to us from such inspection are readily understood when we turn to government work, as an example, which is now carefully inspected and commands much better prices, no one now being so bold as to cut prices, on the assumption that he could cut the quality of the work accordingly.

Proportionately with the growth of the country, less castings are used today than formerly, especially is this so with structure work. Hardly any castings are now used in bridges, wrought iron columns are gradually superceding cast, and rolled beams have almost entirely taken the place of cast iron girders and lintels, and even stairs are now largely made of wrought iron and slate or marble. Even cast pipe is meeting with competition from wrought or rolled pipe. These gradual changes are felt and must be met.

The present severe business depression is keenly felt in ours and kindred industries, and unfortunately intensifies the evil of unhealthy competition in the anxiety to obtain work at any price, thus seriously interfering with the plans of our association, and tending to nullify our acts.

If the values in our country are undergoing a readjustment, which I much fear, we will be compelled to adjust the prices paid and received by us to suit the new order of things. Even now, taking our industry as a whole, it is not profitable, taking into consideration the close application, special knowledge required and the risks connected therewith, as compared to other industries. The question of what we pay and what we receive for our product is one that must receive the consideration of foundrymen in the near future, and one that should be discussed in a convention as I have suggested.

I would also repeat my suggestion of the importance of the organization under each association of the different branches of our industry, such as pipe makers, structural work, machine castings, malleable castings, etc. While this division has been discussed, no decisive action has been taken.

We must employ all means possible to make our monthly meetings interesting, and I desire to impress upon the executive committee the importance of proceeding, as they so well began in this direction, the discussion of subjects of general interest, which besides papers obtained from qualified persons upon subjects bearing on our industry either directly or indirectly, could be published annually for our use.

The beneficial effects resulting from this association have been felt by many

of us, and not one will deny its value, but on the contrary, will help to maintain it in the future, especially through these trying times, which will pass away as sure as sunshine follows a storm, so will we emerge from the difficulties now before us and do our share towards the development of our great country, bearing in mind that the healthy growth of our industry as well as that of our country depends on united and comprehensive action, based on patriotism, good will and good faith between us.

A Social Session.

The Philadelphia Foundrymen's Association held their annual meeting November 1, at the Manufacturers' Club in that city, a very large attendance being present.

The election of officers resulted in choosing the same ones as last year.

The question of chemical analysis that had received so much discussion previously was talked over very generally. The impression seemed to be that the majority of foundrymen would not require chemical determinations, but want information to set them aright when the product was not satisfactory. For instance, if the iron from the cupola proved to be soft one day and hard another without any seeming reason, fonndrymen would like to have some practical information regarding the cause of it, directions concerning the charging of the cupola, etc., as iron can be hard from so many causes besides the one of mixture, to which mistakes are so often freely laid. The idea, however, of procuring analysis showing how much silica, carbon, manganese or sulphur existed in the iron would amount to nothing, so far as the average foundryman was concerned.

After the business of the meeting was concluded an adjournment was had to the roof garden of the club, where a supper was served and a number of speeches were made, the subject being principally the World's Fair. Messrs. Birkinbine, Devlin, Stirling, Whitney and Evans gave their experiences and told what they saw in the Machinery building, Krupp's exhibit. While there was no special exhibit of gray iron casting, a fair sample could be seen in the various parts of machinery in different places throughout the grounds, and the impressions gathered were that castings made in Philadelphia and vicinity were equal if not superior to those made in other parts of the country. It is claimed that Philadelphia foundries outnumber those of any other city in the world. The improvements and facilities have been looked into and today hold first place in the foundry world.

The majority of those present were sure that now that the Repeal bill had finally passed the Senate the country was on the road to prosperity, though all agreeing that if it had been done much sooner, the resumption of business would have been a great addition to the fall trade, but as it is now it is too late for much in that direction. Those present also thought that the tariff issue was the real cause of our depression, and that it would likely remain until the tariff matter was disposed of one way or the other.

Concerning the Association itself, the members were all well pleased with the work during the past year. It has brought out much information of subjects which can be considered as authoritative, and which has been also more or less of an original nature. The friendly relation between foundrymen of that section of the country has improved greatly through their being brought together by the Foundrymen's Association, which of itself alone is considered to amply repay all interested for the work done. The initiation fees and dues collected are used for gathering information for foundrymen.

This association is certainly progressing; it has passed through the initiatory or doubtful stage of success, and THE FOUNDRY believes it on the high road to prosperity.

The foundry of D. J. Bolenger was burned at Waynesborough, O., October 14. Loss, $5,000; insurance, $500.

*Address of President Francis Schuman delivered at the annual meeting held at the Manufacturers' Club, Philadelphia, Nov. 1.

NOTICE.

Advertisements inserted under this head for 25 cents a line each insertion.

WANTED—A foundry foreman capable of taking charge of an iron foundry in all its details. Apply in writing, giving age, experience, references, and salary expected, to Gus. V. Brecht, 1201 Cass ave., St. Louis, Missouri.

WANTED—TO LEASE—By a good, steady molder of large experience, a small foundry with an established trade employing from three to six men; would put a foreman's interest in such a foundry. C. C., "The Foundry."

FOUNDRY FOREMAN of long experience desires a position where ability and faithful services will be appreciated; good record; distance no object. Address "Faithful," care "The Foundry."

FOR SALE—Hand-power traveling crane, 16-feet span with racking gear and brake; low price; terms, cash. The Sargent Co., Chicago, Ill.

Among the Foundries.

The Hassell-Talcott Foundry, in Colorado City, Col., has been busy all through the dull times.

The Dominion Foundry and Supply Co., at Montreal, have started a mill at Richmond, Que., for making foundry facings, etc.

The T. D. West Co., of Sharpsville, Pa., have commenced suit against the Wellman Steel Co., and garnished several Cleveland concerns.

The Detroit (Mich.) Foundry Equipment Co., reports having received an order for two cranes of large tonnage to go to Amsterdam, Holland.

The Gurney Foundry Co., at Toronto, Ont., are enlarging their stove works. This, they say, will make theirs the most extensive stove works in Canada.

A large propeller blade was recently cast in England with a coating of copper. The copper sheet was placed on the face of the mold fitting it closely, and when the iron was poured, it united by fusion with it.

The Malleable Iron Co., of Montreal, Can, are making alterations and improvements in their works. They have built an extension to their foundry and have put in an air furnace. These improvements will increase their capacity 50 per cent.

Another veteran stove manufacturer has passed away. J. H. Beach, one of the founders of the Bridge & Beach Manufacturing Co., St. Louis, Mo., died in New York City recently in the 65th year of his age. Mr. Beach entered the employ of the late H. E. Beach in a clerical capacity at the age of 21. When only 29 years of age he was taken in as a partner, the firm name being changed from Bridge & Brother to Bridge, Beach & Co., which was again changed on its incorporation to the Bridge & Beach Manufacturing Co.

LOUIS T. LACHER.—Louis T. Lacher died October 21 at his home, 15 Fay street, Utica, N. Y., in the 69th year of his age. He was born in Gebweiler, Alsace, France, and came to this country when 26 years of age. For a time he resided in New York, but for the past forty years Utica had been his home. Mr. Lacher was a molder by trade, and had worked in the foundry of Philo S. Curtis nearly twenty years, for the last ten years filling the position of foreman. The illness which resulted in his death was almost the only one he ever suffered. He was an industrious man, always at his work, and enjoyed the confidence of his employer and the esteem of his associates. Mr. Lacher was quiet in his tastes and essentially a home man. He was a kind husband and father and a good friend. He was a faithful member of St. Patrick's church. Those who knew him, and they were many, found much in Mr. Lacher's character to admire.

In Russia it is forbidden under heavy penalties to employ children under 12 years of age in factories; maximum day for children over that age is limited to eight hours; boys under 17 and women are not permitted to work nights in certain branches of industry.

The oldest work in the West on algebra is that of Diophantus of Alexandria, in the Fourth century. It consisted originally of thirteen books, written in Greek, and contained arithmetical problems. Only six of the books are now extant.

The Boston common council has struck the word "union" from a resolution introduced by the printers' union, providing that the city printing should be done in a union printing office.